

another. On this detail, however, it were ungrateful to dwell with too much emphasis, and the more so as our own slowness of perception may have added greatly to the difficulty. It is far more pleasant in concluding, to propose to him a hearty vote of thanks, and to express the earnest hope that he will soon place before us some other classical work once buried in Scepis or elsewhere, in similar English dress and form.

BENJAMIN WARD RICHARDSON

FLAMMARION'S "ASTRONOMY"

Les Étoiles et les Curiosités du Ciel. Par Camille Flammarion. (Paris: C. Marpon et E. Flammarion, Éditeurs, 1881.)

WHATEVER may have been the cause of that development of astronomical taste in England which would so greatly astonish our resuscitated forefathers, and is a puzzle to some plain-thinking people even at this day, the fact admits of no doubt; and a very cheering fact it is to those who value the intellectual and æsthetic progress of their fellow-countrymen. But it is perhaps not so generally known that a movement of the same nature has been in progress among our neighbours across the Channel. It originated later in point of time; for France had entered into no such competition when the Herschels, Lassell, Dawes, Smyth, and other non-professional observers were attracting the notice of all Europe by their discoveries; and we recollect, less than twenty years ago, having heard from M. Léon Foucault a candid admission of the inferiority of his own country in amateur observation. But the Gallic mind is more rapid in its movements than our own; and though later in the field we are not sure that they are not shooting ahead of us in these matters in a way that we in general are perhaps hardly prepared to expect. At least, the fact mentioned in the volume before us, that during two years previous to last October, 300 telescopes had been sold to French purchasers, may be accepted as rather a startling proof: and not less so is the extraordinary circulation of the works of M. Flammarion, whom we may justly call the leader of the movement. As many as 50,000 copies in two years have been printed of his "Astronomie Populaire," of which "Les Étoiles" is considered the supplement; his "Merveilles Célestes" have reached 38,000; and his "Pluralité des Mondes" has come out in a 30th edition; to say nothing of other works of remarkable acceptance. Nor is it probable that the success of this publication will fall below that of its predecessors, treating as it does of a most interesting subject in an especially agreeable and familiar way. It is certainly not a volume which an English publisher would like to risk—an octavo of the largest size, of nearly 800 pages, and thick and heavy in proportion; anything in short but a handbook; but this, which would discourage an English buyer, is evidently no objection in the eyes of a Parisian firm. And it must be owned that in many respects it may well command a wide circulation. The idea is that of exhausting all the wonders of the sidereal heavens that the naked eye can reach, and describing their telescopic aspect; and it is excellently carried out for popular purposes; and we may add in certain respects for scientific ones also. The great value of the work consists in the especial pains taken with the

probable changes of brightness in a multitude of naked-eye stars, not included in the ordinary enumeration of variables; but it is interesting in many other respects; and the close is enriched with a number of catalogues of telescopes, double and coloured and variable stars, their spectra, proper motions, parallaxes, and other data; together with many descriptions of planets, comets, &c. In short, it is a mine of information for those who do not care to dig deep; and those who would desire more authenticated and *weighted* details (observers will understand the word) may yet meet with much of interesting and valuable suggestion. The book has, however, some drawbacks which ought to be noticed.

Among many useful and some needless illustrations, there are a few (as that of the nebula in Andromeda, where the canals are invisible) of a very inferior stamp; and it is not free from carelessness in assertion, and even misleading statements; for instance, where Hevel is represented (p. 403) as never having in his life used the telescope for purposes of observation. The author should have said, as applied to divided instruments; or we might think he had forgotten the "Selenographia." Nor can we suppose that he made much inquiry as to the classical meaning of "in diem" (p. 525) when he rendered it "pendant le jour." The mythological part is more amusing than valuable: more agreeable perhaps to French than English taste; the theological—if it may be so called—is not only out of place, but worthless.

However, on the whole, the work displays a vast amount of industry and a wonderful range of knowledge; and the enthusiasm of the author for his subject is truly refreshing. Even when a process of unacknowledged appropriation has been indulged in, the borrowed plumage has been so ingeniously adapted and so gracefully worn as almost to claim unmerited forgiveness; but whenever his materials may be drawn he manipulates them with accomplished dexterity. His facile and lively style carries us most pleasantly along, and if his passionate eloquence is occasionally rather turgid for our more moderate temperament, it is sometimes exceedingly powerful and impressive. A more thoroughgoing manual might be produced for close practical study; but—allowing for the defects that we have mentioned—nothing that we know of as yet equals it for familiar use and attractive illustration.

OUR BOOK SHELF

Populäre Astronomie von Sim. Newcomb, Astronom in Washington. Deutsche vermehrte Ausgabe, bearbeitet durch Rud. Engelmann, Dr. Phil. (Leipzig: Engelmann, 1881.)

THIS is much more than a simple translation of Newcomb's "Popular Astronomy," reviewed in these pages at the time of its publication. The editor thinks that as the original work was mainly written for American students, it would only be fair to German students and astronomers that the German edition should be adapted to a German standpoint. At the same time there is little trace of any special nationality in this edition, the aim of the editor having been rather to make it as complete and comprehensive as possible. Considerable additions have therefore been made both to the text and the illustrations, all of them we think improvements. In the second part, for example, much additional information has been added with reference to instruments and methods; additional

details are given on the last transit of Venus, on spectroscopic methods, photography and photometry, &c. In the third part additional data are given with reference to the sun, its temperature, spots, rotation, spectrum, &c.; the chapter on Comets has been to a great extent rewritten, and additional recent data given with respect to meteorites. Part 4, referring to stars and star-systems, astro-physical research, the development of our earth, &c., has also been considerably modified and added to. Several important modifications have also been made in the Appendix. The literature of the subject has been considerably extended and rearranged, while a series of biographical sketches of astronomers from the earliest date down to the present time has been added, a feature of great interest and utility. As frontispiece there is a fine portrait of Sir William Herschel. These are a few of the modifications which have been made in the German edition of Prof. Newcomb's work, some of which the author may consider it advisable to adopt in a new edition.

The Chemical Cause of Life Theoretically and Experimentally Examined. By Oscar Loew and Thomas Bokorny. *Brochure.* (Munich, 1881.)

THIS is a very important addition to our knowledge of the chemistry of plant life, or rather perhaps of the chemical reactions of "living" protoplasm. It is divided into two parts, a theoretical and experimental, following the idea first started by Pflüger concerning "physiological combustion in the living organism." One of the authors has already (*Pflüger's Archiv*, xii. 510) enunciated an hypothesis as to the formation of albumin by condensation of aldehydic groups with amido groups. As Nägeli has shown, various varieties of mould and Bacteria are able to build up the very complex albuminoid groups from relatively very simply constituted bodies like ammoniac acetate, also from bodies like sugar, glycerine, &c., in the presence of ammonia or ammonia salts; it may be assumed that the same atomic group is split off and assimilated by the organism. The authors are of opinion that a group CHOH isomeric with formic aldehyde is the first or starting group in the formation of albuminoids. Such a group might possibly be formed, for example, by the oxidising action of moulds on acetic acid; or it might be split off from compounds where it already exists, the neighbouring group becoming fully oxidised. Considering that ammoniac acetate and methylamine suffice under proper conditions for the building up of albuminoid groups, an otherwise constituted body than aldehyde can scarcely be considered. As the proportion of carbon to nitrogen in albumin is as 4 to 1, four such aldehyde groups may be imagined to combine with one molecule of am-



monia to a group $\begin{array}{c} | \\ \text{CH}_2\text{COH} \end{array}$, which, although not yet isolated would be an aldehyde of aspartic acid; and a $3\text{H}_2\text{NCH} \cdot \text{COH}$

further condensation of $\begin{array}{c} | \\ \text{CH}_2 \cdot \text{COH} \end{array}$, to $\text{C}_{12}\text{H}_{17}\text{N}_3\text{O}_9$,

and this again under the reducing action of sulphur to $\text{C}_{72}\text{H}_{112}\text{N}_{18}\text{SO}_{22}$, two molecules of water being eliminated at each condensation. To prove the presence of an aldehyde group in living cells the reducing power of that body on solutions of salts of several easily reducible metals was examined in detail. The most reliable and rapid indication of the existence of aldehyde groups was found to be a very dilute silver solution. This reagent was decided upon after a very thorough examination of a number of other metallic salts with aldehyde and other carbon compounds. The experiments with cell substance or protoplasm of *Algæ*, &c., show that during the period of "living" the silver salt is always reduced to metal, but that when by any means heating or drying by the action of salts, &c.—which exert a dehydrating or anti-

septic action by which the "life" of the plant is destroyed—the reducing action on silver salts is destroyed also. Some of the alkaloids afford a striking exception, the cell's substance yielding an equally distinct silver reaction before and after a week's treatment with one per cent. solution of strychnine, &c. The authors are of opinion that certain aldehyde groups exist in protoplasm, and that it is to the chemical energy of such groups that the "living properties" of the protoplasm are to be ascribed.

Between the Amazons and Andes; or, Ten Years of a Lady's Travels in the Pampas, Gran Chaco, Paraguay, and Matto Grosso. By Mrs. M. G. Mulhall. (London: Edward Stanford, 1881.)

THE regions traversed by Mrs. Mulhall have always had a great fascination for the traveller, and though a good deal has been done of late years towards obtaining an exact knowledge of these remote parts of the world, still there are vast tracts of country between the Andes and the Atlantic, which offer virgin fields for geographical research.

From Buenos Ayres to Cordoba, to Mendoza, and beyond the latter as far as the Inca's Bridge, with an excursion by sea to Rio Grande, and back by land by way of Villa de Melo, not to count sundry short excursions, constitutes a tour extending over several thousands of miles, that required all the courage and determination of an Englishwoman to accomplish, as Mrs. Mulhall has done, successfully; and this record of her visit to the ruined shrines of the Jesuit missions, to the hunting-grounds of several native tribes, to the little-trodden forests of the Amazons, and to the slopes of the Andes, will be read with interest and profit.

Mrs. Mulhall's account of the plague at Buenos Ayres in 1870 is most graphic: the destruction was fearful, the city losing 26,000 souls. The natural history notes are not numerous; now and then, however, some facts of interest are mentioned. On the line of the San Louis Railway the ostriches are so numerous as to cause much trouble; for whenever a workman left any bolt or screw out of his hand, were it only for a moment, they disappeared, being swallowed up by these birds, and one of the engineers declared that they even went so far as to pick the bolts out of the iron bridges if they were left by chance unriveted!

At Corrientes, the house of a friend of Bonpland, the botanist and companion of Humboldt, was visited, and Mrs. Mulhall gives us an extract from a manuscript in Bonpland's handwriting which begins: "I was born at Rochelle on August 29, 1773. My real name was Amadé Goujaud. My father—a physician—intended me for the same profession. It was on account of my great love for plants that he gave me the sobriquet of Bon-plant, which I afterwards adopted instead of my family name."

At Lomas a farmer's wife gave the authoress a sample of white silk made by a large harmless gregarious spider. The silk appeared suitable for weaving, and a pair of stockings made from it are said to have been sent as a present to the King of Spain.

As an appendix to the second volume there is a history of the rise and fall of the Jesuit Missions in South America. The rise of these Missions marked a period of great prosperity. During the seventeenth and eighteenth centuries they were a theme of admiration among the writers and statesmen of Europe. To-day the traveller sees but the ruins of splendid churches that were built during that time, and the remains of some native sculpture and wood carving.

Geometrical Exercises for Beginners. By Samuel Constable. (London: Macmillan, 1882.)

THE title of this book seems to us hardly to hit the object for which it is really adapted. Exercises for